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Itinerant density instability at classical and quantum critical points YEJUN FENG, Argonne National Laboratory, JASPER VAN WEZEL, FELIX FLICKER, Univ. of Bristol, JIYANG WANG, D.M. SILEVITCH, P. B. LITTLEWOOD, T. F. ROSENBAUM, Univ. of Chicago — Itinerant density waves are model systems for studying quantum critical behavior. In both the model spin- and charge-density-wave systems Cr and $NbSe_2$, it is possible to drive a continuous quantum phase transition with critical pressures below 10 GPa. Using x-ray diffraction techniques, we are able to directly track the evolution of the ordering wave vector Q across the pressure-temperature phase diagram. We find a non-monotonic dependence of Q on pressure. Using a Landau-Ginsburg theoretical framework developed by McMillan for CDWs, we evaluate the importance of the physical terms in driving the formation of ordered states at both the thermal and quantum phase transitions. We find that the itinerant instability is the deciding factor for the emergent order, which is further influenced by the critical fluctuations in both the thermal and quantum limits.

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